Leifer, A. D.

Name: ALEIFER Project: PREMI

Department: Psychiatry

Project Description: Through July 31, 1969, I will use ACME for data analysis only. Perhaps I will enter permanent data files into ACME during this period. The data analysis that is planned now will consist of calculation of means, standard deviations, slopes, correlations, t-tests, and analyses of variance.

The project for which this data analysis is being done is a long-term study (five years) of the effects of temporary separation during the early post-partum period on maternal behavior and subsequent infant development. The study includes as subjects both premature and fullterm infants and their mothers and fathers. The data which will be analyzed under my account is that obtained from time-sampling observations of mother and infant during routine caretaking at home and in the Stanford Hospital. Many other measures of the mother, father, and infant are taken by others involved in the project. Much of this data will also be analyzed on ACME, but under P. Herbert Leiderman's account. Principal investigators for this project are P. Herbert Leiderman, Department of Psychiatry, and Clifford R. Barnett, Departments of Anthropology and of Pediatrics and Human Development. The project is supported by grants from NICHD and from the Grant Foundation, New York, New York.

Currently, two reports of the results of the mother-infant observations are being completed, one for submission to Science and one for presentation at the March meetings of the Society for Research in Child Development. Data analysis for these papers was done on ACME, but I do not believe it accurate to say that the papers are "based on my use of ACME". However, if you should want more complete titles, etc., please ask for them.

Levine, R. L.

Name: RLLEVINE Project: CPS

Department: Pediatrics - S332

Project Description: (A complete project description was submitted to the Medical Scientist Training Program Committee.)

The project, 'Carbamyl Phosphate Synthetase in the Mammaliam Pyrimidine Pathway', will hopefully form the basis of a thesis undertaken as a Medical Scientist Trainee of the NIH. Stipend support comes from the NIH but laboratory space and research expenses are provided by my preceptor, Dr. Norman Kretchmer.

The purpose of the initial investigations (in progress six months) is to isolate and purify the carbamyl phosphate synthetase involved in fetal pyrimidine synthesis. This enzyme is apparently distinct from that providing carbamyl phosphate for the urea cycle, whose enzymatic activities appear later in gestation than the de novo pyrimidine activities.

The major work thus far has been on development of a rapid simple assay for the enzyme. This work will continue, probably to July 31, 1969 and beyond. Lack of an acceptable assay has hampered work in the field for years. My primary use of ACME has been to evaluate and process data obtained during assays. There is no question that without ACME asssitance the already burdensome assay work would become intolerable.

It is expected that as work with the purification progresses, we will examine possible regulatory and control mechanisms in which this enzyme may be important.

I may also become involved in another project with Dr. Kretchmer which will use ACME services, but probably not until after July 31, 1969.

Levinthal, E. C.

Name: ELEVINT Project: MM71

Department: Genetics

Project Description: We are just initiating efforts to use ACME for photo-interpretation and enchancement. The direct application is for the 1971 Mars Mariner Orbiter. The photointerpretation techniques will be applicable to medical research problems as they have already been at the Jet Propulsion Laboratory.

Liebes, S. J.

Name: S_LIEBES Project: MS

Department: Genetics

Project Description: This project is directed toward the development and application of techniques of high-spatial-resolution mass spectroscopy to organic materials of biological interest. The current investigation involves the use of focused radiation from a pulsed ruby laser to vaporize portions of solid samples in the ionization chamber of a Bendix Time-of-lFlight mass spectrometer. The plume of vaporized material is ionized by electron bombardment and the time evaluation of the mass spectra of these ions is monitored at a 10-kc/sec repetition rate.

The materials so far studied include amino acids, the nitrogenous base constituents of DNA, samples of DNA, nucleohistone, lymphocytes, fibroblasts, and red blood cells. We are moving now to the comparison of normal versus abnormal blood and tissue samples.

The ACME computer facility serves the following important supportive functions:

1. Automation of data acquisition--in the conventional warmed crucible mode of operation;

2. Storage of all derived mass spectral data;

3. Manipulation and comparison of data--certain aspects of these operations involve extensive use of the interactive television graphic display;

4. Performance of analytical studies related to the interpretation of data, the refinement of existing instrumentation, and the development of new apparatus.

Lorenson, M. Y.

Name: MLORENS

Department: Pharmacology

Project: PFK1

Project Description: A portion of the research work carried out in this laboratory is on the sheep heart enzyme, phosphofructokinase. Investigations are being made on the binding of carbon-14 labelled ligands to the enzyme. It is hoped that from these data, information will be gained on the molecular mechanisms by which this enzyme and possibly carbohydrate metabolism are controlled and regulated in vivo. The method being used involved chromatography on G-25 Sephadex columns which have been equilibrated with the radioactive ligand. In order for a thorough study, large numbers of columns must be run. Statistical analyses must be made on a large number of fractions including (1) calculation of radioactivity present; (2) specific activity of ligands; (3) determinations of units of enzyme activity; (4) determinations of protein concentrations and specific activities; (5) and binding and the standard deviations involved. In addition, the data are summarized and related to the concentrations of unbound ligands. If the computer was not used for these calculations, the information to be gained would be difficult to compile and the research work would be slowed considerably.

Luetscher, J. A.

Name: JLUETSC Project: Bloodpr

Department: Medicine - Metabolic Research

Project Description: Our research project, supported by the USPHS (AM-03062), deals with the secretion and metabolism of adrenal hormones. Various steroid hormones, catecholamines, and trophic hormones are measured under different conditions of sodium loading or sodium depletion. We attempt to define and relate groups of measurements, which assist in the identification of curable forms of hypertension.

The ACME system is used in this project in several ways:

(1) To assist in the calculation of laboratory data, involving difficult procedures, such as the double isotope derivative method, which requires solution of simultaneous equations.

(2) Interpretation of data: (a) Simulation of complex systems (for example, the study of reactions in which substrate and enzyme concentrations are regulated by different systems and may vary independently; or distribution and metabolism of hormones). (b) Statistical analysis (comparison of means and variance of different groups, or correlations between different observation). (c) Analysis of clinical information (the association between different observations, or the effects of drugs, diets, etc.).

(3) Data files are used to store information at various stages of a sequential process, and for collection and analysis of the large amount of clinical and laboratory data which accumulates during a long investigation.

(4) The computer has been used extensively in research training of Fellows and staff, first in principles and techniques of computer used, and subsequently in practical applications.

Lumb, J. R.

Name: JLUMB Project: C-TUMOR

Department: Medicine - Micro

Project Description: The purpose of this project is the biochemical characterization of alkaline phosphatase of thymic lymphomas in C57Bl mice. This enzyme does not occur in normal thymic lymphocytes. These lymphomas are known to be induced by viruses. This investigation is to determine whether the information for this enzyme is contained in the virus or is cellular. This is being done by characterizing the enzyme biochemically and comparing these results to those found in embryo thymuses and other normal organs. ACME is used for statistical interpretation of the results.

Luzzatti, L.

Name: LLUZZAT Project: GRAGSON

Department: Pediatrics

Project Description: The computer has been used to study a family with a chromosomal mosaicism in 3 generations. Measurements of involved chromosome pairs from affected individuals and normal controls were entered, and means, standard deviations and percentage differences calculated. Distribution curves and three-dimensional histograms to classify different cell lines were also done by the computer. This program is now completed and the majority of the files will be deleted.

At present, the computer is used to store information on history, physical findings and diagnosis on patients with congenital defects. For each patient, a set of anthropometric measurements and dermatoglyphic patterns will also be entered. Our goal is to provide means for correlation of presence of major or minor congenital defects among each other and in relationship to the pregnancy and family histories. Clustering of certain anomalies in a given patient defines a certain phenotypic expression or "syndrome". The computer should be able to provide a "diagnosis" when the appropriate set of symptoms is presented, and new syndromes may be further defined by specific clustering of symptoms. The basic information on patients is already programmed and stored; the historical data have been programmed but have not been stored as yet. We are presently developing a program for storage of the physical findings, anthropometry and dermatoglyphics. Information obtained from this program will have a significant educational value for medical students and house officers in addition to providing clues for investigation.

MacPherson, L.

Name: LMACPHE Project: META

Department: Psychiatry (Veterans Administration)

Project Description: PROPOSAL AND METHOD OF STUDY. We plan to investigate the significance of the CNV and aspects of the MP studying their similarities, differences, interrelationships, and relationships to mental states such as selective attention and expectancy. Healthy college student volunteers will serve as subjects. No drugs will be given and no risk to participants will accrue. We will proceed in an explorative fashion with pilot studies, hoping that as possible avenues of investigation are outlined, more difinitive experiments with larger population samples will take shape. We plan to start with the following study.

Ss' AEP will be obtained under the following experimental conditions.

1. Short auditory stimulus presented repetitively and timed randomly. (To obtain AEP evoked by the auditory stimulus.)

2. S presses button randomly whenever he desires. (To obtain MP associated with muscle contraction.)

3. S presses button immediately after hearing randomly presented tone. (To obtain averaged EEG produced in combination by the AEP to the tone and the MP when S attends to an autside command.)

4. S presses button randomly whenever he desires. This produces a tone. (To obtain EEG as in condition #3 except that S is not paying attention to any outside commands.)

5. S hears a tone (conditional stimulus) and when two seconds later another tone appears (imperative stimulus), S presses button quickly. (To obtain the type of CNV that was reported by Walter.)

The averaged EEG potentials of these conditions will be analyzed and compared with each other in order to ascertain which stimuli produce which potential changes under which conditions and in order to elucidate whether and how the CNV reported in the literature is related to the MP.

IMPLICATIONS. The importance of the proposed work of larger scope lies in development of techniques for the concrete electrophysiologic measurement of psychologic states of the mind. Already such related methods have demonstrated surprising corresondence between cerebral AEP findings and mental states of attention, expectancy, conditioning, habituation, meaningfulness, and levels of certainty. The experiment

MacPherson, L. (cont.)

Name: LMACPHE Project: META

Department: Psychiatry (Veterans Administration)

Project Description: described in more detail could clarify the relationship betwen the MP and the CNV. Since muscle activity (e.g., pressing of switches) is widely used as an indicator of S's intent or state of mind, elucidation of the relationship between CNV and MP is needed.

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Maffly, R. H.

Name: RMAFFLY Project: CO2

Department: Medicine (Veterans Administration)

Project Description: Under study is active sodium transport by the toad bladder. We correlate three variables: short circuit current, CO_2 production and $^{Cl}Y_{O_2}$ proudction. The computer is used to calculate the variables and to interrelate them, and to perform statistical analyses.

At the V.A. Hospital I plan to collect data on all patients with elevation of blood urea nitrogen and all with decreased serum sodium concentration and to use the computer to find out the predictive value of a variety of test and procedures and laboratory data.

Mesel, E.

Name: EMESEL

Project: DOGLAB

Department: Pediatrics

Project Description: One of the parameters to be derived from indicator dilution measurements of pulmonary blood flow is the "impulse response", which is essentially the distribution of transit times of particles through the lungs. If $Ci(t)$ represents the dye concentrations in the right heart following injection of a bolus of dye at $t=0$ and $Co(t)$ represents the concentration in the left heart, then the impulse response $h(t)$ is described by the equation:

$$Co(t) = \int_{s=0}^{s=t} h(s)Ci(t-s)ds$$

Replacing the integral with a summation over equally spaced intervals of time:

$$Co(n) = \sum_{i=0}^{n} h(i)Ci(n-i)$$

Thus a program can be written for a digital computer which solves for the function $h(t)$ when given the values for $Ci(t)$ and $Co(t)$

However, a simple straightforward solution yields an impulse response which is hopelessly disrupted by artifacts in the collected data. A technique must be employed which somehow filters the data. Several possible methods are known; one has in fact been successfully used. The program was executed on the Burroughs 5500, a machine which has twelve significant figures in regular precision and twenty-four with double precision. A similar program attempted in ACME accumulated so much error during execution that it proved useless. Thus if we are to acheive our goal using ACME, we must somehow obtain greater precision than is now available. Our current efforts are directed at this problem of insufficient precision.

Mesel, E.

Name: EMESEL

Project: VSD

Department: Pediatrics

Project Description: Project VSD is concerned with blood flow through ventricular septal defects (VSD) surgically produced in dogs. Two major sets of comparisons are made: the pattern of flow through the VSD is compared with the pattern of differential pressure between the left and right ventricles and with the electrocardiogram (ecg); and and flow measured by an electromagnetic flow probe (which we consider a primary standard) is compared with flow measured by other techniques used on people (Fick, dye dilution).

During the experiment, VSD flow, left and right ventricular pressures, and the ecg are recorded on tape. The more interesting data are selected for A to D conversion and for computation of the differential pressure by program WORKHORSE. Program LISTING lists digitized data, which, when graphed, permits comparison of the pattern of flow with the pattern of differential pressure. As might be expected, we have found that these patterns are very similar even under varying conditions (e.g., ectopic beats), with flow slightly delayed with respect to pressure. Program cathlog produces a file which summarizes all our VSD experiments.

Future effort will be directed towards the incorporation and use of programs developed in project carcat for pattern recognition of pressure and flow contours.

Mesel, E.

Name: EMESEL Project: CLINIC

Department: Pediatrics

Project Description: The object of this project was to store patient identification information, and diagnoses obtained at each step in the course of illness (clinical - OPD or IPD, cardiac catheterization, surgery, autopsy) in ACME files. This work was patient-service oriented but had several experimental aspects such as the structuring of the filing schemes to permit rapid access (while conserving the amount of file space utilized), and the utilization of the stored information for hospital planning purpose, evaluation of patient survival with different modes of therapy, etc. Plans are to discontinue this project until such time as adequate clerical assistance is available to implement the filing system.

Mesel, E.

Name: EMESEL Project: CARCAT

Department: Pediatrics

Project Description: Project "carcat" analyzes cardiac catheterization pressure tracings in children. From catheters in the right and left heart, pressure tracings to determine atrial, ventricular, arterial, venous and wedge pressures. Currently the values in millimeter of mercury are calculated for the a and u waves, x and y troughs, and mean pressures in the artia and great veins, for systolic and end-diastolic pressures in the ventricles, for systolic, diastolic and mean pressures in the great arteries, and for mean pressures for the wedge positions. These values are calculated immediately and printed out on the computer terminal in the catheterization room.

At this time, efforts are under way to improve and ascertain the accuracy of the algorithms used in pattern recognition for atrial and ventricular pressure tracings.

The basic data acquisition and analysis system that has been set up will also be used to store data acquisition and analysis system that has been set up will also be used to store data for additional calculations and for the preparation of reports. As data is accumulated in storage from cardiac catheterizations and from other sources of clinical information, it will be possible to analyze large amounts in clinical data rapidly using the ACME computer. Research into methods of storing and recalling data for analysis of clinical information will be an important part of our future efforts.

Miller, R. P.

Name: R_MILLER Project: BIOSTAT

Department: Preventive Medicine

Project Description: The Division of Biostatistics, Department of Preventive Medicine, provides biostatistical consulting to persons doing medical research in the Stanford Medical Center and occasionally elsewhere, such as Presbyterian Hospital in San Francisco. Some of the people who have consulted us in the past years have been Dr. Ken Gardner, Dr. Yule, Dr. Maffly, Dr. Hart of Infectuous Diseases.

The Division also trains postdoctoral fellows and some graduate students in Statistics in biostatistical consulting. Investigations of statistical methods may also be done by the staff, postdoctoral fellows, or graduate students.

The computer is used in all these activities.

Monnin, L. M.

Name: L_MONNIN Project: DISCRIM

Department: Speech and Hearing Sciences

Project Description: A study of the relationship of articulation and identification abilities of normal speaking and speech defective children. Distorted speech stimuli will be presented to the subjects so that an identification threshold can be estimated.

Morris, S. J.

Name: SMORRIS

Project: EXPT4

Department: Genetics

Project Description: I am using the 1800 to interface a Packard liquid scintillation counter to the 360. This allows me to feed raw data directly into the 360 where it can later be retrieved and digested. The original interfacing work was done in lieu of a language requirement for my PhD. The system will be used to analyze the incorporation of radiolabeled amino acids into brain proteins.

See ACME Note TRA-1 for a full discription of the system.

Nall, M. L.

Name: L_NALL__ Project: PSORIASI

Department: Dermatology

Project Description: Psoriasis is a chronic, scaling skin disease of unknown etiology, which affects approximately 4% of the general population (no accurate figures are available). It is a lifetime disorder which does not take life, but indeed destroys it for all age groups.

The Department of Dermatology of the Stanford Medical School is a world center for both clinical and laboratory investigations on psoriasis. As one phase of the over-all Psoriasis Research Program, the Department is engaged in a continuing investigation of the epidemiology of the disease. A questionaire survey has been conducted from 1959 to date.

Presently, the Department is conducting Series II, III, and IV of its questionnaire survey; doing follow-up studies on the familial incidence of psoriasis and the relationship of psoriasis to other diseases, i.e., arthritis, diabetes, throat infection (The findings from Series I, which had been computerized on the 7090 are now being handled by the 360/50 and 67.).

We have applied to the National Research Council to participate in their Twin Registry of Veterans, in order to utilize the twin method in our study of the etiology of psoriasis. In addition, we are applying to utilize their registry of veterans in a large scale epidemiology investigation. Hopefully, both will be financed by an NIH grant. The application of ACME to the computerized phase of our findings has been indicated in all grant protocols.

Nall, M. L.

Name: L_NALL__ Project: MYCOSIS

Department: Dermatology

Project Description: Mycosis fungoides is a fatal skin disease of unknown etiology. Various chemotherapeutic agents (i.e., nitrogen mustard, steroids, etc.) have been utilized to abate this disease, but the x-ray and elctron beam are the only techniques that have proven effective in producing remissions. The Stanford School of Medicine and the Massachusetts General Hospital are the only facilities in this country, who have applied the beam in treating mycosis fungoides; although recently the Varian Company has developed smaller accelerators which will be used in other hospitals.

Drs. Harold Schneidman and William Watson of the Dermatology Department conducted a retrospective study on the effect of the electron beam in comparison to other methods of treatment. In a pilot study of 51 mycosis patients (treated at the Stanford Medical Center in the Radiology Department), the investigators developed a data gathering form. The coded information was keypunched and read into ACME as a data file, which was computed via a number of input-output programs. Although no paper has been published as yet (since the study is in progress), the results of the pilot study were presented by Drs. Schneidman and Watson at the annual Meeting of the American Academy of Dermatology in Chicago in December. The investigators were able to learn from their preliminary study that by applying the electron beam at an early stage of the mycosis that longer periods of remission will result. This information is a pioneering fact; albeit, more detailed studies will be forthcoming to substantiate this early data.

Dr. Schneidman has supported this effort from his personal funds and plans to continue to do so. Thus, we are concerned in keeping our ACME costs at a minimal level.

Noble, E. P.

Name: EPNOBLE_ Project: ALCOHOL

Department: Psychiatry

Project Description: We have been studying the effects of alcohol on the central nervous system of rodents. This study is supported by MH 14599 from the NIMH. A study of alcohol's effect on the pituitary adrenal system is being studied in various inbred mouse strains. We are also studying the effects of central nervous system lesions on alcohol preference phenomenon in mice. Finally, the mechanism of central nervous system adaptation to alcohol and other stressors is being considered.

It is our plan to continue the use of ACME facilities for the period to July 31, 1969. This service has been extremely valuable and has resulted in three publications based on its use.

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[illegible], W. N.

Name: WNYE Project: STUDENT

Department: Medicine - Micro

Project Description: Under this user name, several people in this department have used this project for statistical calculations and bibliography compilations. Several of the users have been graduate students of the department or postdoctoral fellows. The bibliography compilation will probably be published in the new Biochemistry Handbook by Dr. Kirschbaum.

Payne, R. O.

Name: R_PAYNE Project: SERNAL

Department: Medicine - Hermatology

Project Description: The research is concerned with extending the classification of leukocyte and/or tissue antigens by serologic and genetic analysis of specific human antisera. In the computer programs, 1) donor-recipient pairs of individuals are selected for deliberate immunization to produce antisera and 2) the antisera are analyzed by comparing their reactions with test cells in 2 x 2 tables for associations between them. The significant associations are calculated, and the frequency of positive reactions are determined.

Pearson, M. L.

Name: MPEARSO Project: CTCOR

Department: Biochemistry

Project Description: The program is used to compute normalized chromatographic elution profiles of viral SRNA. We have found that induction of lysogenic bacteria results in the formation of a set of small molecular weight ordered RNA's coded by phage λ DNA. These RNA's have physical characteristics similar to transfer RNA and may be intimately involved in genetic control. The set of viral RNA's can be fractionated on benzoylated deae columns. The computer normalizes the elution profiles of viral RNA's to a constant total output RNA, allowing comparison of the relative amount of each viral RNA from one column run to the next.

It is anticipated that future programs will be used to calculate quench-corrected values of radioisotope activity in double-label experiments, using data from a liquid scintillation counter.

Petralli, J. K.

Name: JPETRAL Project: MED_DATA

Department: Infectious Diseases

Project Description: A COMPUTER METHOD FOR IMPROVEMENT OF ANTIBIOTIC SENSITIVITY DATA AND GUIDANCE IN THERAPY. J. K. Petralli*, S. Wallis*, T. C. Merigan. Department of Medicine, Stanford University, School of Medicine, Palo Alto, California.

To improve the quality of antibiotic sensitivity data (high potency single disc method) and to guide the interpretation of results and antibiotic selection a computer program has been developed. Clinical information and zone sizes are entered each day on the IBM 360 time sharing computer (which allows on-line continuous data generation). Each zone size is compared with limits based on previous results and unusual values are challenged for further study. This system rapidly detects unusual organisms or laboratory error. The computer converts zone sizes to resistant, intermediate, or sensitive and prints final reports from its memory. Decreased potency of antibiotic disc is detected by comparison of periodically determined mean zone sizes. Limits of confidence of a single reading are established by review of zone sizes observed with a standard organism tested on different occasions. Knowledge of antibiotic sensitivities of organisms isolated from a specific site such as blood or urine will help to guide the selection of antibiotics before specific sensitivities are known. Such information is of value in selection of antibiotics in treating rarely encountered organisms with less well known sensitivity patterns or in selection of alternate antibiotics when the first choice drug is hazardous. Yearly comparison of antibiotic sensitivity patterns obtained will give information about major trends and suggest appropriate changes in treatment of various infections.

Porter, R. W.

Name: RWPORTER

Department: Biochemistry

Project: ATC_KIN

Project Description: Project ATC_KIN has been used for data processing in the investigation of the steady-state kinetics of the enzyme, aspartate transcarbamylase. The programs were written for curve-fitting the data from different types of kinetics experiments. For example, program "DataFit" employs a simple linear least squares fit to calculate the initial rate of reaction from the raw data, measured as amount of radioactivity versus time of reaction, and converts the result to standard units of specific enzyme activity, using units of concentration.

Other programs calculate the kinetic parameters using a linear least squares fit for the reciprocal transformation, due to Lineweaver and Burke, of the Michaelis-Menten equation. Another program, "Hyper-Fit", was written to fit the non-linear, hyperbolic function of the original Michaelis-Menten equation. The program employs a reiterative procedure of trial-and-error testing for optimal fit. Trial values for the two parameters of the Michaelis-Menten equation are tested for minimizing the residual, and the procedure is reiterated to give a close approximation of the best values.

This computational procedure was refined and optimized for speed, and the program will compute the best values for the two parameters, to an accuracy exceeding that of the data, in less than ten seconds of computer time in a time-sharing environment. This approach proved to be so successful that it was adapted for curve-fitting other, more complex non-linear kinetic equations with more parameters. For example, the non-linear equation describing substrate inhibition, with three parameters, which does not give a simple linear reciprocal transformation, has been employed directly, using this trial-and-error technique. In addition, the family of hyperbolic curves described by the equation for competitive inhibition, with three parameters, has been employed successfully.

The greatest success of this technique has been the use of equations with four parameters for curve-fitting, such as the equations describing non-competitive inhibition and parabolic competitive inhibition. With correspondingly longer times for calculation, these programs have provided quantitative support for the existence of certain reaction intermediates in the pathway of this enzyme mechanism.

Porter, R. W. (cont.)

Name: RWPORTER Project: ATC_KIN

Department: Biochemistry

Project Description: These programs make special use of the on-line communication available with the ACME system, especially through the use of options and operator-controlled branchpoints in the programs. The results of these kinetic studies have been reported to The Journal of Biological Chemistry, where they will be published in March. The manuscript for this report was prepared making extensive use of the manuscript editing facilities of ACME. The authors of the report are Robert W. Porter, Michael O Modebe, and George R. Stark, and the title is "Aspartate Transcarbamylase: Kinetic Studies of the Catalytic Subunit".

Reaven, G. M.

Name: G_REAVEN

Project: DISPLAY

Department: Medicine

Project Description: We are interested in developing models of glucose, insulin and triglyceride kinetics as related to diabetes mellitus and atherosclerosis. Clinical data obtained from tracer studies are analyzed by the ACME computer through five stages of development. The project display includes the third and fourth stage. In the third stage, the program PEEL automatically obtains the parameters for a linear sum of exponentials and the program SKINNER obtains parameters which are the constant coefficients of a system of linear differential equations. The results are used for the fourth stage. In this phase, the parameters are used for calculation of a theoretical curve which is displayed on a CRT. It is then compared with data which also appears on the CRT. The results of PEEL and SKINNER get us into the "ball park" and we change parameters until we obtain a satisfactory visual fit. In this phase we use the programs RUNGCURV, DATA, TDATA and berman.

We are in the process of preparing two manuscripts in which the results are based on the above program support. The first paper is a mathematical model of insulin distribution in man in vivo and the second paper is a description of the use of on line display procedure for determining physiological models of metabolic processes. We are now performing similar analysis with respect to triglyceride metabolism and are extending the insulin work. We expect to use the above procedures the entire year and expect to extend stage 4 and develop stage 5 for analysis of nonlinear metabolic models.

Reaven, G. M.

Name: G_REAVEN Project: FIT

Department: Medicine

Project Description: (See discussion in Project DISPLAY.) The final phase is at the present being developed. The results of simulation in stage 4 is to be statistically evaluated to see if the parameters obtained do not violate the statistical limitations of the data. At the moment, we are doing this is a crude manner at the Computation Center. However, the most satisfactory results are obtained if the statistical evaluation is coupled to stage 4. We plan to use nonlinear regression techniques to evaluate these parameters. We have developed four programs for this procedure; they are RUNGPOW, sPOWELL, COVARE and EXPOPOW.

Reaven, G. M.

Name: G_REAVEN Project: PAT DATA

Department: Medicine

Project Description: (See discussion in Project DISPLAY.) This project includes Stage 1 and Stage 2. Stage 1 and Stage 2 are support programs for Stages 3, 4, and 5. In Stage 1, serum endogenous insulin is biologically assayed by the program INSULIN. The program TGCONRAD determines triglyceride concentration and the program DOUBLE estimates counts from double label experiments. The final program in this phase WEIGHT estimates weights of data points for future statistical analysis. The second stage consists of statistical support programs for evaluation of the results of Stage 1. The programs used in this phase are TEATEST, RAT, NOVA, CORL, and REGRESS.

Our research activities also include procedures to determine weight patterns of patients. The programs involved in this aspect are BODYCOMP and BODYFAT.

Reitan, J. A.

Name: J_REITAN Project: INDIRECT

Department: Anesthesia

Project Description: We are processing cardiac internal timings collected by non-invasive, indirect techniques in order to monitor the contractile state of the heart under varying loads and drugs.

Reynolds, W. E.

Name: WEREYNOL

Project: S007

Department: Genetics

Project Description: This project supports the basic development of automation in computer-mass spectrometer instrumentation systems. This worker is an instrumentation engineer, hence the remarks about the biological aspects will be brief.

The mass spectrometer has become a powerful tool in the elucidation of organic molecules. This is of great interest in the biochemistry field and in the case of DNA and related structures to the Genetics Department. Since the basic principles involved are common to at least the Genetics Department and Organic Chemistry, the physical instruments and location are sometimes shared. This is the case for this project. Hence the efforts of this project span over 5 mass spectrometers in 3 diverse locations on the Stanford campus.

The technical development consists in the origination of instrumentation concepts, and realization, in both hardware and software, complete operating systems.

These systems are intended to automate the mass spectrometer (low resolution Bendix t-o-f, Finnigan quadrupoles, Atlas CH-4 and a high resolution AEI MS-9) to provide the following benefits to the biological user-researcher:

Savings of the researcher's time in instrument operation and data reduction.

Improve the quality of the data.

Improve the presentation of the data.

Foster computer files of pertinent data.

This is being accomplished by basic research and development in the application of computers, both dedicated and time shared to the field of computer-instrument integration.

The ACME system is being used by this user both as the final computer in the automated system and as an engineering design aid to achieve the final systems.

Reynolds, W. E. (cont.)

Name: WEREYNOL Project: S007

Department: Genetics

Project Description: Publication - COMPUTER CONTROL OF MASS ANALYZERS. A paper given, and published in the proceedings of, The Sixteenth Annual Conference on Mass Spectrometry and Allied Topics. (May 1968, Pittsburg, Pa.) (ASTM Committee E-14).

Reynolds, W. E.

Name: WEREYNOL Project: TEXTS

Department: Genetics

Project Description: This is a text management project to support general engineering efforts in instrumentation. The project supported is: W.E.REYNOLDS.S007. "TEXTS" contains commercial technical data and information retrieval programs.

Robertson, W.

Name: W_ROBERT Project: UGAG

Department: Pediatrics

Project Description: (1) Data on urinary analyses of glycosaminoglycans both on patients and normal individuals will be entered. The curve relating concentrations to age in normal children will be developed. The values of groups of children with different diseases will then be compared with normals to discover which diseases lead to abnormal excretion.

(2) Analytical data on immunoglobulin concentrations in sera from patients with a variety of immunologic diseases will be entered and correlations developed with the clinical state of the patient and therapy.

(3) Data on the binding of ligands to macromolecules, e.g., cortisol to hyaluronic acid will be used to determine association constants.

Rosenberg, L. T.

Name: L_ROSENB Project: ALEXINE

Department: Medicine - Micro

Project Description: We are studying levels of serum complement in mice using ACME to carry out the appropriate statistical analyses and calculations. We are storing accumulated data on large numbers of mice of diverse pedigree. Using ACME facilitates data retrieval.

Rosenthal, W. S.

Name: W_ROSENT Project: RESEARCH

Department: Medical Student - Speech and Hearing Science

Project Description: I am using the computer essentially for statistical analysis of data in connection with various experimental studies in speech and language pathology and normal speech perception. These studies include research in effectiveness of stuttering therapy, speech and auditory perception in aphasic children, and normal speech perception in adults and children. Plans through July 31, 1969 include continuation of above usage as well as possible use of the computer in a language perception simulation program.